

**REMARKS**

In the Office Action dated January 30, 2003, the Examiner has *finally rejected* claims 11, 14-16, and 18-29 pending in the application on the basis of new ground(s) of rejection and newly cited art. Applicant respectfully requests reconsideration and withdrawal of the finality of the rejection of the Office Action dated January 30, 2003.

A good and sufficient reason why the present response is necessary and was not earlier presented is that entirely new references have been cited in the present final rejection date January 30, 2003 (37 CFR §1.116(c)). The new references are Shinji Takeda (USPN 6,014,318) (hereinafter "Takeda") and Takashi Noguchi (USPN 6,107,679) (hereinafter "Noguchi") which are for the first time brought to Applicant's attention by means of the present *final rejection* dated January 30, 2003. The new references, i.e. Takeda and Noguchi, were not cited in the present application prior to the instant final rejection. Since Takeda and Noguchi are references upon which the Examiner has now relied, Applicant believes that it would be manifestly unfair for the Patent Office not to consider Applicant's arguments, which are necessitated due to the newly cited references, Takeda and Noguchi.

The Examiner has rejected claims 20-23 and 25-28 under 35 USC §102(e) as being anticipated by Takeda. For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by independent claims 20 and 25, is patentably distinguishable over Takeda. However, Applicant reserves the right to provide

declarations and/or documents under 37 CFR §1.131 to “swear behind” the effective filing date of Takeda.

Subject to Applicant’s reserved right to establish priority of the present invention under 37 CFR §1.131, Applicant submits that the present invention, as defined by independent claims 20 and 25, includes, among other things, “a through hole traversing said first and second layers of metal of said printed circuit board,” “said through hole being filled with a mold compound,” where the mold compound surrounds and covers a die and “is locked into said first and second layers of metal of said printed circuit board.” As disclosed in the present application, during a molding process mold compound is forced into the through hole and also forced around the die attached to the top surface on the printed circuit board. As disclosed in the present application, by utilizing a mold compound selected from the group consisting of multifunctional epoxy, novolac, and biphenyl resin, the present invention achieves a strong chemical bond between the mold compound in the through hole and the walls of the through hole, which comprise resin.

Furthermore, as disclosed in the present application, the relatively rough surfaces of the mold compound and resin on the walls of the through hole form a strong mechanical bond. The chemical and mechanical bond between resin on the walls of the through hole and the mold compound effectively “stake down” the mold compound to the second layer of metal on the top surface of the printed circuit board. Furthermore, the mold compound in the through hole is also locked into the first and second layers of metal

of the printed circuit board to additionally secure the mold compound to the top surface of the printed circuit board.

In contrast to the present invention as defined by independent claims 20 and 25, Takeda does not teach, disclose, or suggest “a through hole traversing said first and second layers of metal of said printed circuit board,” “said through hole being filled with a mold compound,” where the mold compound surrounds and covers a die and “is locked into said first and second layers of metal of said printed circuit board.” Takeda specifically discloses vapor holes 7, which are exposed vertically from the boundary face of sealing resin at wiring substrate 1. See, for example, column 6, lines 4-7 and Figure 9 of Takeda. In Takeda, vapor holes 7 provide exhaling routes of expanded water vapor formed in wiring substrate 1 and are filled with epoxy resin or solder resist material. See, for example, Takeda, column 6, lines 4-11. In Takeda, vapor holes 7 are formed in wiring substrate 1 and filled with epoxy resin or solder resist material prior to molding of a BGA package with sealing resin. See, for example, column 5, lines 33-49 and Figure 10 of Takeda. Thus, in Takeda, vapor holes 7 are not filled with mold compound during a molding process, since vapor holes 7 are filled with epoxy resin or solder resist material prior to sealing the BGA package with sealing resin (i.e. mold compound). Consequently, vapor holes 7 cannot lock mold compound into first and second layers of metal of a printed circuit board, since vapor holes 7 are not filled with mold compound.

Moreover, in Takeda, vapor holes 7 are utilized to provide exhaling routes for expanded water vapor that forms in wiring substrate 1, which is a completely different

function compared to utilizing vapor holes 7 to “stack down” mold compound. As such, Takeda teaches away from utilizing vapor holes 7 to “stack down” mold compound to the second layer of the printer circuit board. Furthermore, Yamaguchi does not even mention any chemical or mechanical bond that may be formed between the epoxy resin or solder resist material and the walls of vapor holes 7. For the foregoing reasons, Applicant respectfully submits that the present invention, as defined by independent claims 20 and 25, is not suggested, disclosed, or taught by Takeda. As such, the present invention, as defined by independent claims 20 and 25, is patentably distinguishable over Takeda. Thus claims 21-23 depending from independent claim 20 and claims 26-28 are, *a fortiori*, also patentably distinguishable over Takeda for at least the reasons presented above and also for additional limitations contained in each dependent claim.

The Examiner has rejected claims 11, 14-16, and 18 under 35 USC §102(e) as being anticipated by Noguchi. For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by independent claim 11, is patentably distinguishable over Noguchi. However, Applicant reserves the right to provide declarations and/or documents under 37 CFR §1.131 to “swear behind” the effective filing date of Noguchi.

Subject to Applicant’s reserved right to establish priority of the present invention under 37 CFR §1.131, Applicant submits that the present invention, as defined by independent claim 11, includes, among other things, a blind hole traversing a second layer of metal situated below a die attached to a printed circuit board, where the blind hole is

filled with mold compound, which locks the second layer of metal to the printed circuit board. The present invention, as defined by independent claim 11, achieves similar advantages as independent claims 20 and 25 discussed above.

In contrast to the present invention as defined by independent claim 11, Noguchi does not teach, disclose, or suggest a blind hole traversing a second layer of metal situated below a die attached to a printed circuit board, where the blind hole is filled with mold compound, which locks the second layer of metal to the printed circuit board. Noguchi specifically discloses counter sinks 18 at the bare ends of base material 1. See, for example, column 4, lines 3-8 and Figure 5(b) of Noguchi. In Noguchi, conductive patterns 3 are formed on the surface of base material 1. See, for example, column 2, lines 5-9 and Figure 5(b) of Noguchi. However, in Noguchi, counter sinks 18 do not traverse conductive patterns 3 and, as such, counter sinks 18 cannot lock conductive patterns 3 to base material 1. Furthermore, Noguchi does not teach, disclose, or suggest counter sinks 18 traversing conductive patterns 3 formed on the top surface of base material 1.

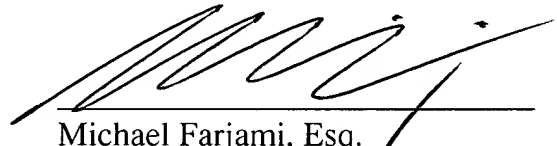
For the foregoing reasons, Applicant respectfully submits that the present invention, as defined by independent claim 11, is not suggested, disclosed, or taught by Noguchi. As such, the present invention, as defined by independent claim 11, is patentably distinguishable over Noguchi. Thus claims 14-16 and 18 depending from independent claim 11 are, *a fortiori*, also patentably distinguishable over Noguchi for at least the reasons presented above and also for additional limitations contained in each dependent claim.

The Examiner has further rejected claim 19 under 35 USC §103(a) as being unpatentable over Noguchi in view of U.S. patent number 5,825,628 to Garbelli et al (“Garbelli”). As discussed above, independent claim 11 is patentably distinguishable over Noguchi. Thus claim 19 depending from independent claim 11 is, *a fortiori*, also patentably distinguishable over Noguchi for at least the reasons presented above and also for additional limitations contained in each dependent claim.

The Examiner has further rejected claims 24 and 29 under 35 USC §103(a) as being unpatentable over Takeda in view Garbelli. As discussed above, independent claims 20 and 25 are patentably distinguishable over Takeda. Thus claim 24 depending from independent claim 20 and claim 29 depending from independent claim 25 are, *a fortiori*, also patentably distinguishable over Takeda for at least the reasons presented above and also for additional limitations contained in each dependent claim.

Based on the foregoing reasons, the present invention, as defined by independent claims 11, 20 and 25, and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 11, 14-16, and 18-29 pending in the present application are patentably distinguishable over the art cited by the Examiner. As such, and for all the foregoing reasons, an early Notice of Allowance of claims 11, 14-16, and 18-29 pending in the present application is respectively requested.

Respectfully Submitted,  
FARJAMI & FARJAMI LLP

  
Michael Farjami, Esq.  
Reg. No. 38, 135

Date: 5/6/03

Michael Farjami, Esq.  
FARJAMI & FARJAMI LLP  
16148 Sand Canyon  
Irvine, California 92618  
Telephone: (949) 784-4600  
Facsimile: (949) 784-4601

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